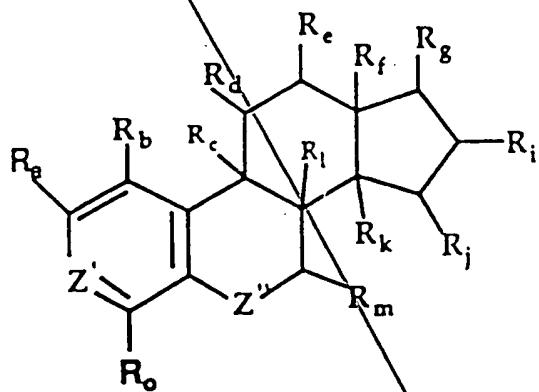


Claims

1 1. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a - R_o are defined as follows:

10 A) ~~each~~ $R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,$
11 ~~each~~ $R_m, R_o,$ independently is $-R_1, -OR_1,$

46 $>C-(CH_2)_n-CR_2$, $>C-(CH_2)_n-C-OR_2$,
 47
 48

49 $>C-(CH_2)_n-CHR_2$, $>C-(CH_2)_n-CH-OR_2$,
 50
 51

52 $>C-NH(CH_2)_n-CR_2$, $>C-NH(CH_2)_n-CHR_2$,
 53
 54

55 $>C-NH(CH_2)_n-CH-OR_2$,
 56
 57

58 $>C-NH(CH_2)_n-C-OR_2$, $>C-NH(CH_2)_n-OR_2$
 59
 60

61 $>C-NH(CH_2)_n-R_2$, $>C(CH_2)_n-NHCR_2$,
 62
 63

64 $>C-(CH_2)_n-NHC-OR_2$,
 65
 66

67 $>C-(CH_2)_n-NH-CHR_2$, $>C-(CH_2)_n-NH-COR_2$, or
 68
 69

70 $>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;
 71
 72

73 or

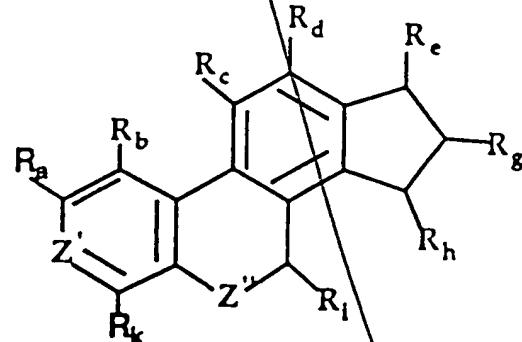
74 B) Z'' is $-Y-CH-$ or $-CH-Y-$ where R_p
 75
 76
 77 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
 78 and

79 IV. provided that when each R_b , R_c , R_d , R_e , R_i , R_j , R_k ,
 80 R_1 , R_m and R_o is H;
 81 R_f is $-CH_3$;

82 ~~R_g is -OH;~~
83 ~~Z' is >COH; and~~
84 ~~Z" is >CH₂;~~
85 ~~then R_a is not -H;~~
86 where, in each formula set forth above, each R₁ and R₂
87 independently is -H, or substituted or unsubstituted alkyl,
88 alkenyl or alkynyl group of 1-6 carbons.

1 2. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a - R_k are defined as follows:

10 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
11 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
12 $-F$, $-NHR_2$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
13 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

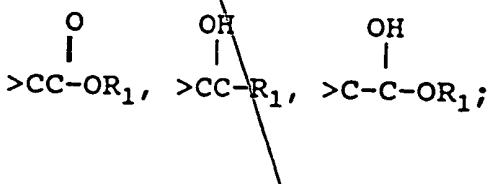
14 or

15 B) each R_a , R_b , R_c , R_d , R_k , independently is
16 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or
17 $-I$; and each R_{eg} , R_h , R_i , independently is
18 $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, or
19 $-I$; and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
20 $-F$, $-Br$, $-I$ or $-C\equiv CH$;

21 and

22 II. Z' is defined as follows:

23
24
25 A) Z' is X , where X is $>COR_1$, $>CC-R_1$,
26
27
28



29 or

30 B) Z' is $=C-X'-$ or $-X'-C=$, where R_n
31
32



33 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,
34 and X' is X , as defined above;
35 or X' is also $>C=O$,

36 and

37 III. Z'' is defined as follows:

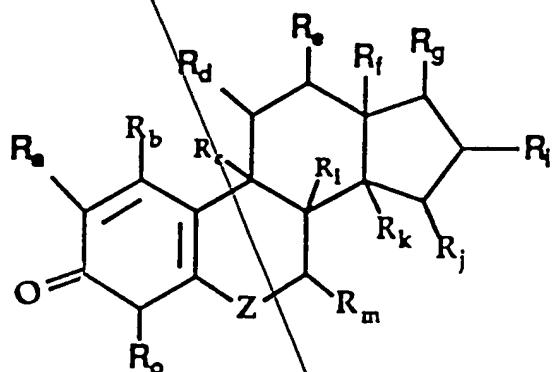
38
39
40 A) Z'' is Y , where Y is $-O-$, $-N-$, $>CHR_1$,

41
 42
 43 $>C=O, >C-(CH_2)_nOR_2,$
 44
 45
 46 $>C-(CH_2)_n-CR_2, >C-(CH_2)_n-C-OR_2,$
 47
 48
 49 $>C-(CH_2)_n-CHR_2, >C-(CH_2)_n-CH-OR_2,$
 50
 51
 52 $>C-NH(CH_2)_n-CR_2, >C-NH(CH_2)_n-CHR_2,$
 53
 54
 55 $>C-NH(CH_2)_n-CH-OR_2,$
 56
 57
 58 $>C-NH(CH_2)_n-C-OR_2, >C-NH(CH_2)_n-OR_2,$
 59
 60
 61 $>C-NH(CH_2)_n-R_2,$
 62
 63
 64 $>C(CH_2)_n-NHCR_2, >C-(CH_2)_n-NHC-OR_2,$
 65
 66
 67 $>C-(CH_2)_n-NH-CHR_2, >C-(CH_2)_n-NH-COR_2, \text{ or}$
 68
 69
 70 $>C-(CH_2)_n-NH-CH_2OR_2, \text{ where } n \text{ is } 0-6;$
 71 or
 72 B) Z'' is $-Y-CH-$ or $-CH-Y-$, where R_p is
 73
 74
 75 $-R_1, -OR_1, -SR_1, -F, -NHR_2, -Br \text{ or } -I;$

76 where, in each formula set forth above, each R_1 and R_2
77 independently is -H, or substituted or unsubstituted alkyl,
78 alkenyl or alkynyl group of 1-6 carbons.

1 3. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a - R_o are defined as follows:

10 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_i , R_j , R_k , R_l ,
11 R_m , R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
12 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $-R_1$,
13 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
14 $-C\equiv CH$;

15 or

16 B) each R_a , R_b , R_c , R_f , R_k , R_1 , independently
17 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
18 or $-I$; and each R_d , R_e , R_i , R_j , R_m , R_o
19 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
20 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $=O$,
21 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$
22 or $-C\equiv CH$;

23 and

24 II. Z is defined as follows:

25 A) Z is Y , where Y is $-O-$, $-N-$, $>CHR_1$,
26 R_1
27 $>C=O$, $>C-(CH_2)_nOR_2$,

28 R_1 O R_1 O
29 $>C-(CH_2)_n-CR_2$, $>C-(CH_2)_n-C-OR_2$,
30 R_1 OH
31 $>C-(CH_2)_n-CHR_2$,

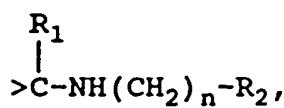
32 R_1 OH
33 $>C-(CH_2)_n-CH-OR_2$,
34 R_1 O R_1 OH
35 $>C-NH(CH_2)_n-CR_2$, $>C-NH(CH_2)_n-CHR_2$,
36 R_1 OH
37 $>C-NH(CH_2)_n-CH-OR_2$,

38 R_1 O R_1 OH
39 $>C-NH(CH_2)_n-C-OR_2$, $>C-NH(CH_2)_n-OR_2$,

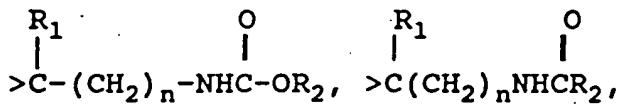
40 R_1 OH
41 $>C-NH(CH_2)_n-CH-OR_2$,

42 R_1 O R_1
43 $>C-NH(CH_2)_n-C-OR_2$, $>C-NH(CH_2)_n-OR_2$,

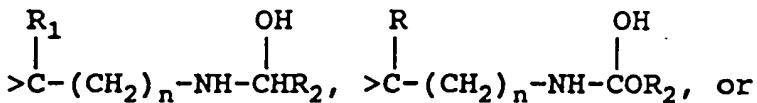
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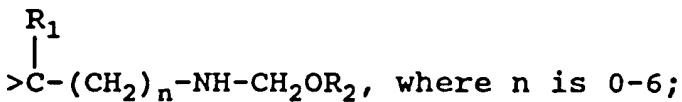
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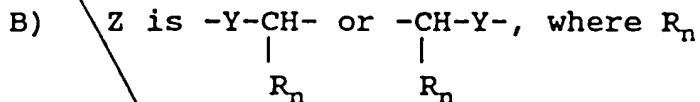


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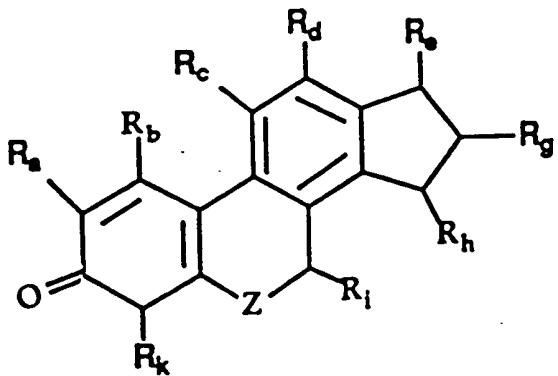
62 or

63
64
65



66 $\begin{array}{c} \text{is } -\text{R}_1, \quad -\text{OR}_1, \quad -\text{SR}_1, \quad -\text{F}, \quad -\text{NHR}_2, \quad -\text{Br} \text{ or } -\text{I}; \\ \text{where, in each formula set forth above, each } \text{R}_1 \text{ and } \text{R}_2 \\ \text{independently is } -\text{H}, \text{ or substituted or unsubstituted alkyl,} \\ \text{alkenyl or alkynyl group of 1-6 carbons.} \end{array}$

1 4. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



7 wherein:

8 I. R_a - R_k are defined as follows:

9 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
10 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
11 $-F$, $-NHR_1$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

13 or

14 B) each R_a , R_b , R_c , R_d , independently is $-R_1$,
15 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, or $-I$
16 and each R_g , R_h , R_i , R_k independently is
17 $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$
18 or $-I$; and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
19 $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

20 and

21 II. Z is defined as follows:

22
23
24

A) Z is Y , where Y is $-O-$, $-N-$, $>CHR_1$,

25
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$>C=O$, $>C-(CH_2)_nOR_2$,

28
29
30

$>C-(CH_2)_n-CR_2$, $>C-(CH_2)_n-C-OR_2$,

31
32
33

$>C-(CH_2)_n-CHR_2$, $>C-(CH_2)_n-CH-OR_2$,

34
35
36

$>C-NH(CH_2)_n-CR_2$, $>C-NH(CH_2)_n-CHR_2$,

37
38
39

$>C-NH(CH_2)_n-CH-OR_2$,

40
41
42

$>C-NH(CH_2)_n-C-OR_2$, $>C-NH(CH_2)_n-OR_2$,

43
44
45

$>C-NH(CH_2)_n-R_2$, $>C(CH_2)_nNHCR_2$,

46
47
48

$>C-(CH_2)_n-NHC-OR_2$,

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51

$>C-(CH_2)_n-NH-CHR_2$, $>C-(CH_2)_n-NH-COR_2$, or

52
53
54

$>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;

55 or

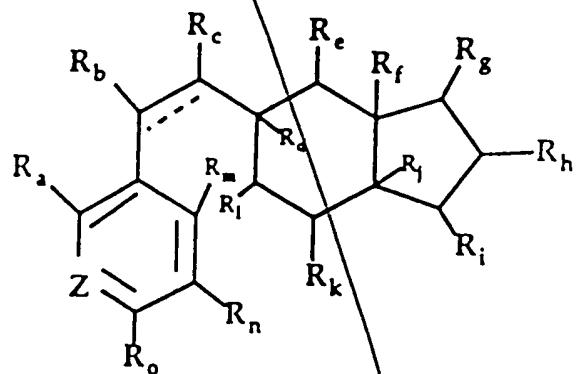
56
57
58

B) Z is $-Y-CH-$ or $-CH-Y-$, where R_n

59 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
60 where, in each formula set forth above, each R_1 and R_2
61 independently is $-H$, or substituted or unsubstituted alkyl,
62 alkenyl or alkynyl group of 1-6 carbons.

1 5. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a - R_o are defined as follows:

10 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_g , R_h , R_j , R_k ,
11 R_l , R_m , R_n , R_o independently is $-R_1$, $-OR_1$,
12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i
13 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
14 $-I$ or $-C\equiv CH$;

15 or

16 B) each R_a , R_d , R_f , R_j , R_m , R_n , R_o
17 independently is $-R_1$, $-OR_1$, $-OCR_1$, $-SR_1$,
18 $-F$, $-NHR_2$, $-Br$, or $-I$; and each R_b , R_c , R_e ,
19 R_g , R_h , R_k , R_l independently is $=O$,
20 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or
21 $-I$; and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
22 $-F$, $-Br$, $-I$ or $-C\equiv CH$;

23 or

24 C) each R_a , R_b , R_c , R_d , R_f , R_j , R_m , R_n , R_o
25 independently is $-R_1$, $-OR_1$, OCR_1 , $-SR_1$, $-F$,
26 $-NHR_2$, $-Br$, $-I$ and each R_e , R_g , R_h , R_k , R_l
27 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
28 $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,
29 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, $-I$ or
30 $-C\equiv CH$;

31 II. Z is defined as follows:

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33

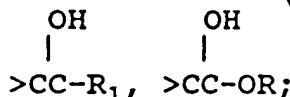
34

A) Z is X, where X is $>COR_1$, $>CC-R_1$, $>CC-OR_1$,

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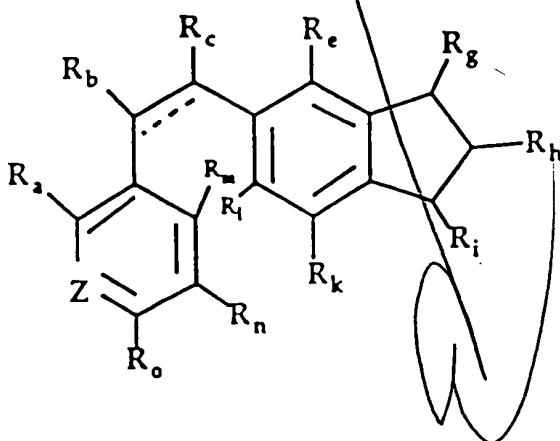
37



38 or

1 6. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a - R_o are defined as follows:

10 A) each R_a , R_b , R_c , R_e , R_g , R_h , R_k , R_l , R_m , R_n ,
11 R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
12 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i is $-R_1$,
13 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
14 $-C\equiv CH$;

15 or

16 B) each R_a , R_e , R_l , R_m , R_n , R_o independently
17 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
18 $-I$ and each R_b , R_c , R_g , R_h is $=O$, $-R_1$,
19 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$;
20 and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$,
21 $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

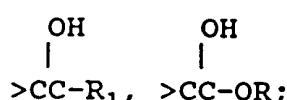
22 or

23 C) each R_a , R_b , R_c , R_e , R_k , R_m , R_n , R_o
24 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
25 $-F$, $-NHR_2$, $-Br$, $-I$, and each R_h , R_i
26 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
27 $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,
28 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$
29 or $-C\equiv CH$;

30 and

31 I. Z is defined as follows:

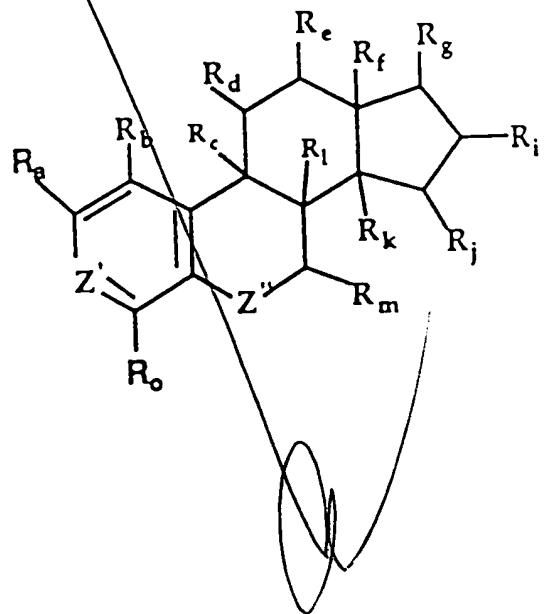
32
33
34 A) Z is X, where X is $>COR_1$, $>CC-R_1$, $>CC-OR_1$,



38 or

7. A compound of the general formula below, said compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. R_a - R_o are defined as follows:

6 (A) each R_a , R_b , R_c , R_d , R_e , R_f , R_i , R_j , R_k , R_l ,
7 R_m , R_o , independently is $-R_1$, $-OR_1$,
8 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g
9 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
10 $-I$ or $-C\equiv CH$;

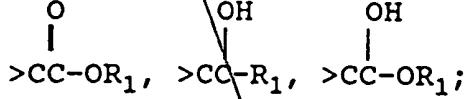
11 or

12 (B) each R_a , R_b , R_c , R_f , R_k , R_l , R_o , is $-R_1$,
13 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$;
14 and each R_d , R_e , R_i , R_j , R_m , independently
15 is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$,
16 $-Br$ or $-I$; and R_g is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
17 $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

18 and

19 II. Z' is defined as follows:

20
21
22 A) Z' is X , where X is $>COR_1$, $>CC-R_1$,



26 or

27 B) Z' is $=C-X'-$ or $-X'-C=$, where R_n

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31
32

$$\begin{array}{c} | \\ R_n \end{array} \quad \begin{array}{c} | \\ R_n \end{array}$$

is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
or X' is X , as defined above; or
 X' is $>C=O$;

33 and

34 III. Z'' is defined as follows:

35
36
37 A) Z'' is Y , where Y is $-O-$, $-N-$, $>CHR_1$,

38
39
40 $>C=O$, $>C-(CH_2)_nOR_2$,

41
42
43 $>C-(CH_2)_n-CR_2$, $>C-(CH_2)_n-C-OR_2$,

44
45
46 $>C-(CH_2)_n-CHR_2$, $>C-(CH_2)_n-CH-OR_2$,

47
48
49 $>C-NH(CH_2)_n-CR_2$, $>C-NH(CH_2)_n-CHR_2$,

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51
52 $>C-NH(CH_2)_n-CH-OR_2$,

53
54
55 $>C-NH(CH_2)_n-C-OR_2$, $>C-NH(CH_2)_n-OR_2$

56
57
58 $>C-NH(CH_2)_n-R_2$, $>C(CH_2)_nNHCR_2$,

59
60
61 $>C-(CH_2)_n-NHC-OR_2$,

62
63
64 $>C-(CH_2)_n-NH-CHR_2$, $>C-(CH_2)_n-NH-COR_2$, or

65
66
67 $>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;

68 or

69
70
71 B) Z'' is $-Y-CH-$ or $-CH-Y-$ where R_p

72 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
73 provided that when:

74 3) each R_b , R_c , R_d , R_e , R_j , R_k , R_l , R_m , is -H;
75 R_f is -CH₃;

84 and

85 4) each R_b , R_c , R_d , R_e , R_i , R_j R_k , R_l ,
86 R_m , is -H;
87 R_f is -CH₃;
88 R_g is -OH; and
89 Z" is >CH₂; then

90
91
92 Z' is not $>\text{COCCH}_3$ or $>\text{COCH}_3$; and
93 each R_a , R_o independently or together are
94 not $-\text{OCH}_3$ or $-\text{H}$;

95 and

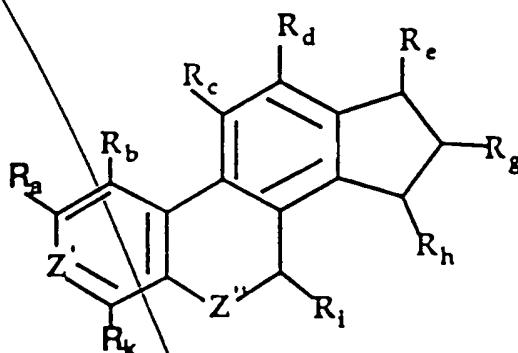
96 5) each R_c , R_e , R_j , R_k , R_l , R_m , R_o is $-H$;
97 R_a is $-H$ or $-OCH_3$;
98 R_b is $-H$ or $-CH_3$;
99 R_d is $-OH$;
100 R_f is $-CH_3$;
101 R_g is $=O$;
102 R_i is $-OH$, $=O$ or $-C\equiv CH$; and
103 Z'' is $>CH_2$; then

104
105
106 Z' is not >COH ; >COCH_3 , or >-H ;

107 where, in each formula set forth above, each R_1 and R_2
108 independently is -H, or substituted or unsubstituted alkyl,
109 alkenyl or alkynyl group of 1-6 carbons.

1 8. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. R_a - R_k are defined as follows:

6 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
7 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
8 $-F$, $-NHR_2$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
9 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

10 or

11 B) each R_a , R_b , R_c , R_d , R_k is $-R_1$, $-OR_1$,
12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and
13 each R_g , R_h , R_i , independently is $=O$,

17 and

18 I. z' is defined as follows:

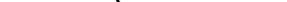
19
20
21 A) Z' is X, where X is >COR₁, >C₂C-R₁,

25 or

32 and

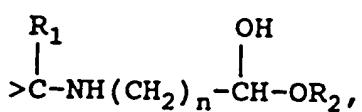
33. II. Z'' is defined as follows:

34
35
36 A) Z" is Y, where Y is -O-, -N-, >CHR₁,
37
38
39 >C=O, >C-(CH₂)_nOR₂.

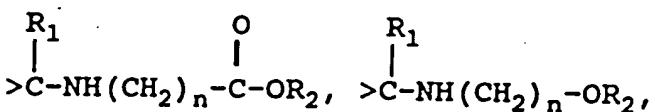
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 41 
 42

43 $\begin{array}{c} R_1 \\ | \\ >C-(CH_2)_n-CHR_2, \end{array}$ 44 $\begin{array}{c} OH \\ | \\ >C-(CH_2)_n-CHR_2, \end{array}$ 45 $\begin{array}{c} R_1 \\ | \\ >C-(CH_2)_n-CH_2-OR_2, \end{array}$

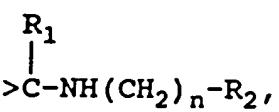
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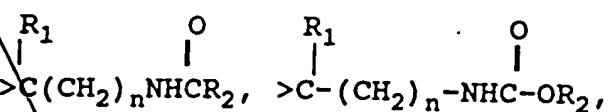
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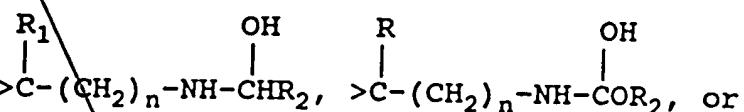
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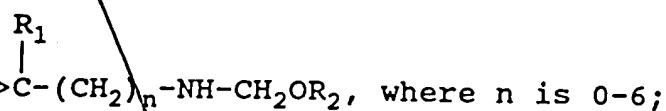
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67 or

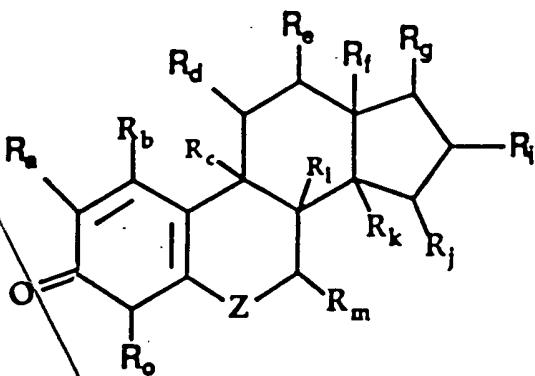
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70

B) Z'' is $-Y-CH-$ or $-CH-Y-$, where R_p is



$-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
where, in each formula set forth above, each R_1 and R_2
independently is $-H$, or substituted or unsubstituted alkyl,
alkenyl or alkynyl group of 1-6 carbons.

1 9. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:



3 wherein:

4 I. R_a - R_o are defined as follows:

5 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_i , R_j , R_k , R_l ,
 6 R_m , R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
 7 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $-R_1$,
 8 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
 9 $-C\equiv CH$;

10 or

11 B) each R_a , R_b , R_c , R_f , R_k , R_l , independently
 12 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
 13 or $-I$; and each R_d , R_e , R_i , R_j , R_m , R_o
 14 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
 15 $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and R_g is $=O$,
 16 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$
 17 or $-C\equiv CH$;

18 and

19 II. Z is defined as follows:

20

21

22

A) Z is Y, where Y is $-O-$, $-N-$, $>CHR_1$,

23

24

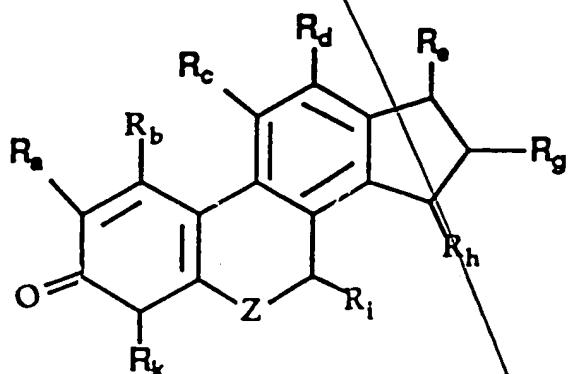
25

$>C=O$, $>C-(CH_2)_nOR_2$,

62 where, in each formula set forth above, each R_1 and R_2
63 independently is -H, or substituted or unsubstituted alkyl,
64 alkenyl or alkynyl group of 1-6 carbons.

1 10. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. R_a - R_k are defined as follows:

6 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
7 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
8 $-F$, $-NHR_1$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
9 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

10 or

11 B) each R_a , R_b , R_c , R_d , independently is $-R_1$,
12 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, or $-I$;
13 and each R_g , R_h , R_i , R_k independently is
14 $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$
15 or $-I$; and R_e is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
16 $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

17 II. Z is defined as follows:

18
19
20 1) Z is Y, where Y is $-O-$, $-N-$, $>CHR_1$,

21
22
23 $>C=O$, $>C-(CH_2)_nOR_2$,

24
25
26 $>C-(CH_2)_n-CR_2$, $>C-(CH_2)_n-C(=O)OR_2$,

27
28
29 $>C-(CH_2)_n-CHR_2$, $>C-(CH_2)_n-CH(OH)OR_2$,

30
31
32 $>C-NH(CH_2)_n-CR_2$, $>C-NH(CH_2)_n-CH(OH)R_2$,

33
34
35 $>C-NH(CH_2)_n-CH(OH)OR_2$,

36
37
38 $>C-NH(CH_2)_n-C(=O)OR_2$, $>C-NH(CH_2)_n-OR_2$,

39
40
41 $>C-NH(CH_2)_n-R_2$, $>C(CH_2)_nNHCOR_2$

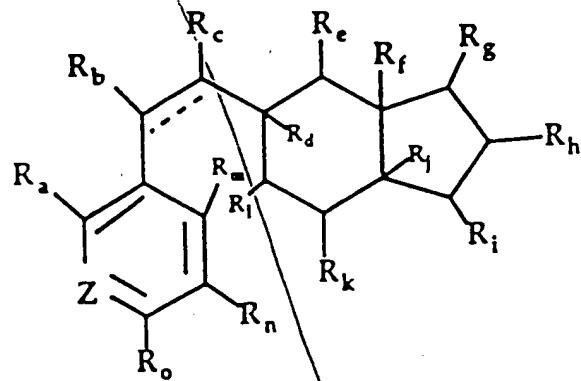
42
43
44 $>C-(CH_2)_n-NHC(=O)OR_2$,

45
46
47 $>C-(CH_2)_n-NH-CHR_2$, $>C-(CH_2)_n-NH-C(=O)OR_2$, or

48
49
50 $>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;

51 or

1 11. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:
3



4 wherein:

5 I. $R_a - R_o$ are defined as follows:

6 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_g , R_h , R_j , R_k ,
 7 R_l , R_m , R_n , R_o independently is $-R_1$, $-OR_1$,
 8 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_1
 9 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
 10 $-I$ or $-C\equiv CH$;

11 or

12

B) each R_a , R_d , R_f , R_j , R_m , R_n , R_o independently is $-R_1$, $-OR_1$, $-OCR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and each R_b , R_c , R_e , R_g , R_h , R_k , R_l independently is $=0$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=0$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

19 or

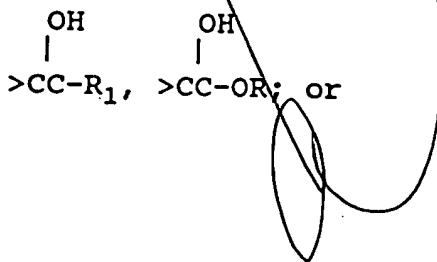
20

C) each $R_a, R_b, R_c, R_d, R_f, R_j, R_m, R_n, R_o$ independently is $-R_1, -OR_1, OCR_1, -SR_1, -F, -NHR_2, -Br, -I$; and each R_e, R_g, R_h, R_k, R_l independently is $=O, -R_1, -OR_1, -OCOR_1, -SR_1, -F, -NHR_1, -Br$ or $-I$; and R_i is $=O, -R_1, -OR_1, -OCOR_1, -SR_1, -F, -NHR_1, -Br, -I$ or $-C\equiv CH$;

27 and

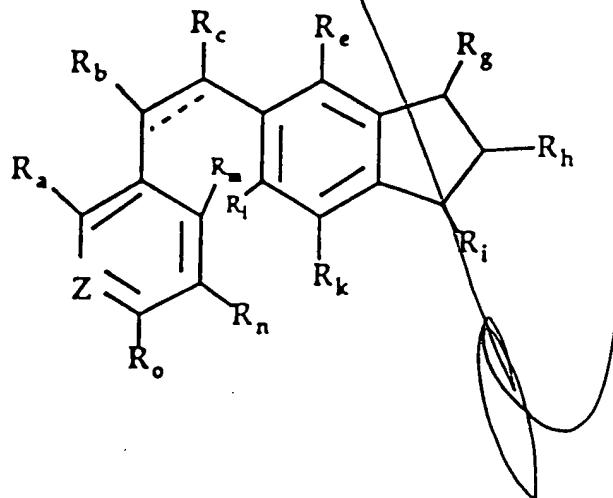
28 I. z is defined as follows:

1) Z is X, where X is >COR₁, >CC-R₁, >CC-OR₁,



1 12. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. $R_a - R_o$ are defined as follows:

A) each R_a , R_b , R_c , R_e , R_g , R_h , R_k , R_l , R_m , R_n , R_o independently is $-R_1$, $-OR_1$, $OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

10 or

B) each R_a , R_e , R_1 , R_m , R_n , R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and each R_b , R_c , R_g , R_h is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_1 is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

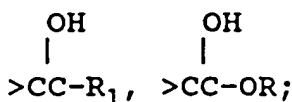
17 or

C) each R_a , R_b , R_c , R_e , R_k , R_m , R_n , R_o independently is $-R_1$, $-OR_1$, $OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and each R_g , R_h independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

and

II. Z is defined as follows:

A) Z is X, where X is >COR_1 , >CC-R_1 , >CC-OR_1 ,



33 or

B) Z is $=C-X'-$ or $-X'-C=$, where R_p

37 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,
38 and X' is X , as defined above;
39 or X' is $=O$;
40 where, in each formula set forth above, each R_1 and R_2
41 independently is $-H$, or substituted or unsubstituted alkyl,
42 alkenyl or alkynyl group of 1-6 carbons; and the bond
43 indicated by $C\bullet\bullet C$ is absent or, in combination with the $C-C$
44 bond is the unit $HC=CH$.

1 13. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-methoxyestradiol.

1 14. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-fluoroestradiol.

1 15. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-bromoestradiol.

1 16. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-methoxyestrone.

1 17. The method of claim 1, wherein said cell-
2 mitosis-inhibiting composition is 17-ethynylestradiol.

1 18. The method of claims 1 or 2 wherein said
2 compound is further characterized in that

12
13
14

C) Z' is $=C-X'-$ or $-X'-C=$; and Z'' is Y .
 R_n R_n

1 19. The method of claims 3 or 4 wherein said
2 compound is further characterized in that Z is
3 $-Y-CH-$ or $-CH-Y-$.
4 R_n R_n
5

1 20. The method of claims 5 or 6 wherein said
2 compound is further characterized in that Z is
3 $=C-X'-$ or $-X'-C=$.
4 R_p R_p
5

1 21. The compound of claims 7 or 8, wherein said
2 compound is further characterized in that

3 A) Z' is $=C-X'-$ or $-X'-C=$; and
4 R_n R_n
5
6 Z'' is $-Y-CH-$ or $-CH-Y-$; or
7 R_p R_p
8
9 B) Z' is X ; and Z'' is $-Y-CH-$ or $-CH-Y-$; or
10 R_p R_p
11
12 C) Z' is $=C-X'-$ or $-X'-C=$; and Z'' is Y .
13 R_n R_n
14

1 22. The compound of claims 9 or 10, wherein said
2 compound is further characterized in that Z is
3 $-Y-CH-$ or $-CH-Y-$.
4 R_n R_n
5

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1 23. The compound of claims 11 or 12, wherein said
2 compound is further characterized in that Z is
3 =C-X'- or -X'-C=.
4 | |
5 R_p R_p

1 24. The method of any one of claims 1-6, wherein at
2 least one of R_a→R_p is -OCH₃.

1 25. The compound of any one of claims 7-12, wherein
2 at least one of R_a→R_p is -OCH₃.

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